

Telepathology in West Africa: a dream or a reality for the diagnosis of cancer?

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Abstract

In September 2015 at Saint John of God Hospital of Tanguieta– Benin an anatomical pathology laboratory was set up with the final goal to supply patients, suffering from cancer diseases, a diagnosis and indications for possible therapeutic procedures. The laboratory was integrated with a telepathology system. This was the first operational laboratory in West Africa.

Figure 1



Keywords

Digital Pathology, Histopathology Laboratory, Management, Telepathology

Introduction

In September 2015 at Saint John of God Hospital of Tanguieta– Benin (Figure 1, 2, 3, 4) an anatomical pathology laboratory was set up with the final goal to supply patients, suffering from cancer diseases, a diagnosis and indications for possible therapeutic procedures. The laboratory was integrated with a telepathology system.

Figure 2



Figure 3



Figure 4



The project, organized during the previous 12 months, consisted in planning the lab on the map of a given space, taking into consideration:

- the different phases of the histologic process undergone by bioptic specimens collected in the operating room;
- the necessary equipment;
- staff training;
- and the optimal methodology required to obtain a diagnosis.

The project should and had to take into account: costs, investment possibilities, present available resources and future sustainability.

The advance technology is “Telepathology”, that is the practice of the science pathology remotely using digital transmission, allowing to reach cyto-histologic diagnosis almost at real time and from great distances.

Method

In 2014 I was contacted by Friar Fiorenzo, director of the surgical unit of Saint John of God Hospital of Tanguieta – Benin, who asked me about the possibility to set up a histology lab in order to give a diagnosis to the many cancer cases operated by them.

Giving my consent to this project, first I asked the map and measures of the place intended for use as a laboratory. The proposed area for the lab was the following. (Figure 5, 6, 7)

Figure 5



Figure 6

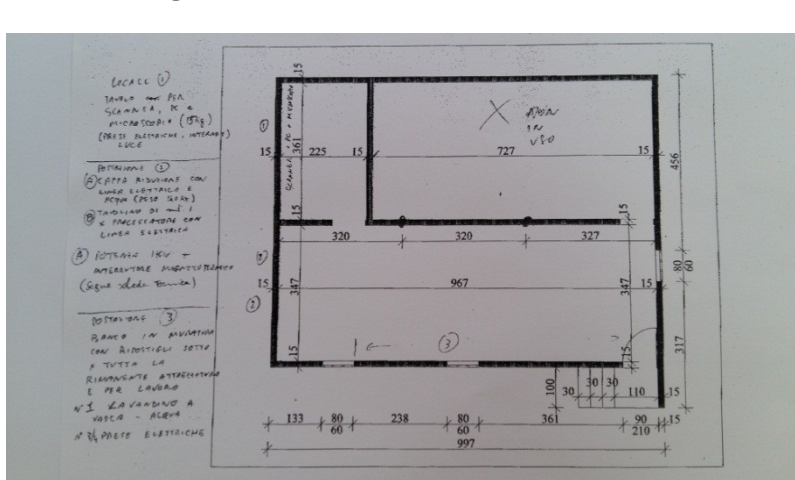


Figure 7



After we proceeded with the following chronology:

- 1.analysis of the necessary instrumentation to satisfactorily equip the lab;
- 2.checking instruments sizes;
- 3.prevision about necessary space to store consumable materials;
- 4.prevision about air-conditioning, lighting and wiring for electric supply and LAN.

When lab area was ready, we installed the equipment and calibrated, programmed and have instrumentation ready for use.

In the end we installed the scanner for telepathology.

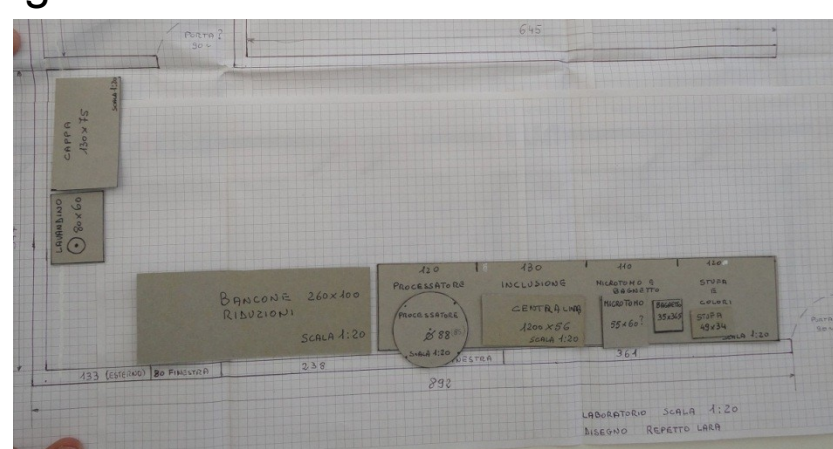
The necessary instrumentation to produce a diagnostic slide from a specimen of surgical bioptic tissue is:

**Hood for tissue sampling - Tissue processor - Paraffin embedding station
Microtome - Water bath - Slide stainer - Slide dryer – Microscope - Surgical instruments, consumable material**

Taking into consideration the size of each instrument, we wrote instruments names on proportionate sheets of paper and located them in the lab map on the spaces intended for the building of workbenches. (Figure 8)

At last we arranged the area dedicated to the telepathology scanner and, since it is very sensitive to vibrations, air current and heat, all lab was provided with air-conditioning.

Figure 8



Telepathology

Telepathology is an area of Telemedicine (the use of telecommunication and information technologies to provide healthcare at a distance), consisting in transferring macroscopic and microscopic digital images through the use of different telecommunication technologies.

Nowadays the most modern scanner allow the pathologist to examine on-line a histological slide in toto and make a diagnosis. That means a pathologist, located anywhere in the world and having access credentials, can directly log in the scanner at Tanguieta, select his assigned case, and change the zoom and position of the examination field.

This is the so called “virtual diagnosis” made on a digital slide.

Regarding the management of clinical records, it is possible to connect the scanner to a specific management software, create an excel file or something else.

Depending on scanner properties, digital images can be viewed at different enlargements (ex.: 20x, 40x, etc.). Moreover it could be possible to upload more than one slide in the instrument at the same time.

Times for scanning can vary from one scanner to another.

The scanner acquired at the anatomical pathology lab in Tanguieta – Benin is a Hamamatsu NanoZoomer 2.0-RS C10730 series (with a loading capacity of 6 slides). - (Figure 9, 10)

Pathologists MAKE A DIAGNOSIS CAN 'SAVE A LIFE - CONNECTED website of Telepathology of Tanguieta - Benin
<http://mailserver.hopitalsj.org/ndp/serve/home>
USERNAME: patologo - - PASSWORD: laboratorio2015
ADDITIONAL INSTRUCTIONS: labanapath_tanguieta@yahoo.fr

Figure 9



Figure 10



Its scanning speed is the following:

15mm x 15mm area at 20x = approx. 60s

15mm x 15mm area at 40x = approx. 150s

Technology is in constant evolution, thus this time could be substantially reduced in the future.

Tanguieta Project Development

The Rev. brother Parfait TCHAOU, attended the Anatomical Pathology Laboratory of Galliera Hospital in Genoa – Italy, where he followed an appropriate training process:sampling of surgical biopsies assisted by a pathologist explaining all macroscopic aspects, followed by a period of assisted independent sampling; inclusion of tissue samples;microtome cutting and production of histological slides for diagnosis. regarding this tutors focused a lot on the quality of preparation, considering that in Tanguieta Lab slides would have to be scanned; basic training on microscopic identification of pathological samples, at least for the more common cancer types.

In September 2015, I, dr Tiziano Zanin, project supervisor, dr Loredana Pennese and the student, Mrs Francesca Cepollina, went to Tanguieta for the project starting up. Using the experience made at Tanguieta, Mrs Cepollina, student of the academic course in Biomedical Laboratory Healthcare Technician Science, prepared her graduation thesis on the role of the Pathology Assistant, a technician able to sample surgical biopsies.(Figure 10)

Figure 10



Figure 11

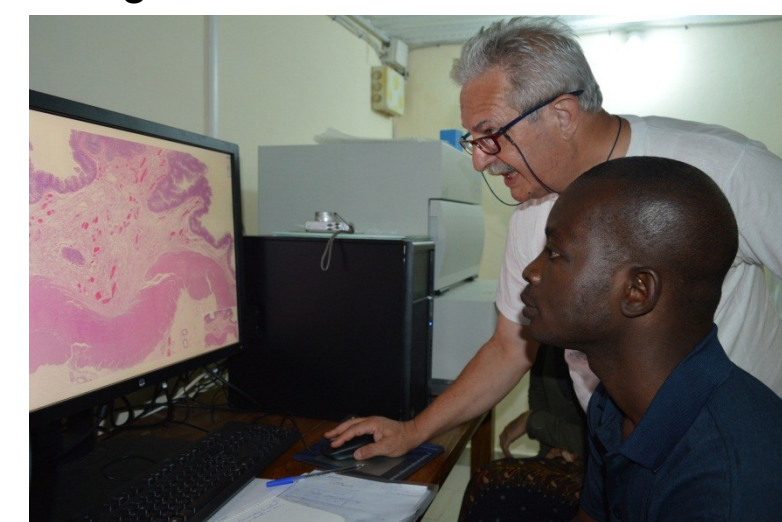


Figure 12



When everything had been set up, we started with the sampling of surgical biopsies collected during previous months. An Excel file was created to register the following data :

Progressive number – Date – Exam Code - Surname and Name - Date of birth - Organ/location of sampling - Clinical diagnosis - N° of samples/embedding cassettes - Referring physician - Histopathological diagnosis - Referring pathologist.

When histological slides were ready, we checked the quality of the obtained sections, that had to be 2 microns thick and perfectly omogeneous.At this point we installed the scan, the most important instrument in the project and also the most delicate.

When the scan was ready to use, I trained friar Parfat on: instrument activating process, visualization program, adjusting of diagnostic areas, focus memory system, zoom control. (Figure 11)

At last the Anatomical Pathology Laboratory of Saint John of God Hospital of Tanguieta – Benin was ready and operative. An official inauguration was made with benediction of spaces and personnel. A temporary plaque was placed at the entrance, highlighting the institutions that made it possible the project fulfillment. (Figure 13)

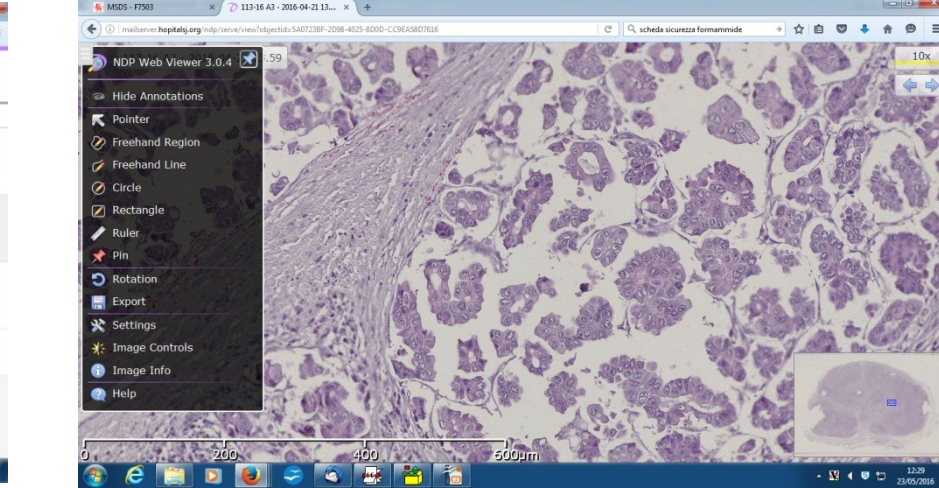
Figure 13



Figure 14



Figure 15



To date almost n. 474 surgical samples have been processed from the Laboratory of Tanguieta, with about n. 200 diagnosis already made. We are still having about 274 virtual slides waiting for pathologists. (Figure 14,15)

Pathologists, that up to now have been regularly collaborating to make diagnosis through the TELEPATHOLOGY system, are the following:

Dr. Genevieve Belleannee-Service de Pathologie CHU de Bordeaux France.(genevieve.belleannee@chu-bordeaux.fr)
Dr. Eliane MeryInstitut Universitaire du Cancer - Toulouse – Oncopole - France(Mery.Eliane@iuct-oncopole.fr)
Dr. Claudio Clemente-Servizio di Anatomia Patologica e Citodiagnostica-IRCCS Policlinico San Donato, Gruppo San Donato - Italy(cclemente.ap@iol.it)
Dr. Frantz Dupuis(dupuisfrantz@gmail.com)
Dr. Isabelle de PINEUX Anatomopathologie - France(dridepinieux@orange.fr)
Dr. Roberto Mencarelli (mencarelli.r@gmail.com)

This is Telepathology in Africa. Thanks to the contribution of FAI (Fondation Assistance Internationale) and the ONG APOF, a dream came true, contributing a lot to the health protection of people in this part of the world ant to the fight of cancer.

The Anatomical Pathology Laboratory in Tanguieta could become a reference and a diagnostic center for other hospitals both in Benin and in neighbouring countries, being the Telepathology Centre of West Africa.

This project needs your help!!!!!!

For donations use the following codes:

- **IT64E0585660900166570004248** - Banca Popolare-Volksbank Marostica - payable U.T.A. Onlus - Project Telepathology Tanguieta
- **IT79T0830960900000000027744** - Romano Bank and Santa Caterina - payable U.T.A. Onlus - Project Telepathology Tanguieta



THANKS TO THOSE WHO WANT TO CONTRIBUTE